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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/564,209	01/09/2006	Arndt Glaesser	4932/PCT	7556

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FASSE PATENT ATTORNEYS, P.A.
P.O. BOX 726
HAMPDEN, ME 04444-0726

EXAMINER	
JARRETT, RYAN A	

ART UNIT	PAPER NUMBER
2125	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/564,209	GLAESSER, ARNDT	
	Examiner	Art Unit	
	Ryan A. Jarrett	2125	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 April 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *16-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *16-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 January 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 16-21 are rejected under 35 U.S.C. 102(b) as being anticipated by EP 1 235 126 A1 (Hirai et al.). For example, Hirai et al. discloses:

16. Method for milling a freeform surface on a workpiece using a milling machine, whereby the workpiece is milled by a tool of the milling machine in such a manner so that a desired freeform surface is formed (e.g., [0033], Fig. 1 #50)**, and to carry out the milling the tool is moved relative to the workpiece along a tool path defined by splines** (e.g., [0034])**, characterized in that the splines are calculated from support points stored in workpiece coordinates or in machine coordinates** (e.g., [0045]) **in a CAD/CAM system** (e.g., Fig. 1 #10, [0079])**, and, independent of the freeform surface to be formed, the tool path is generated from six splines if the support points are defined in workpiece coordinates** (e.g., [0045], [0069]-[0070]: "a NURBS curve 151 expressed by Expressions 1, 2 and 3 and a tool axis vector 152 on each point as shown in Fig. 16 are calculated by a NURBS curve generating method", Fig. 5: "Both (X,Y,Z) and (i,j,k) data shall be converted into NURBS data")**, and is generated from five splines if the support points are defined in machine coordinates, whereby one**

independent spline is produced for each coordinate (e.g., [0045], [0052]: "each NURBS curve of the three linear axes (Mx, MY, Mz) and two rotary axes (B,C) is calculated").

17. Method according to claim 16, characterized in that, for each tool path, the splines are calculated through the use of one or more interpolation parameters which are equal for all of the splines of the respective tool path, so that all of the splines of the respective tool path are synchronized with one another (e.g., Fig. 1 #43).

18. Apparatus for milling a freeform surface on a workpiece, whereby a tool (e.g., Fig. 1 #50) **is adapted to mill the workpiece in such a manner so that a desired freeform surface is formed** (e.g., [0033], Fig. 1 #50), **comprising a programming arrangement (21)** (e.g., Fig. 1 #10) **for programming a tool path, and comprising at least one control arrangement (28)** (e.g., Fig. 1 #50) **for controlling a motion of the tool relative to the workpiece along the tool path defined by splines, characterized in that the programming arrangement (21) is embodied as a CAD/CAM system** (e.g., Fig. 1 #10, [0079]), **and further comprising means (25) allocated to the programming arrangement (21) and adapted to calculate the splines from support points stored in workpiece coordinates or machine coordinates** (e.g., [0045]) **in the CAD/CAM system in such a manner so that the means (25), independent of the freeform surface to be formed, are adapted to generate the tool path from six splines if the support points are defined in workpiece coordinates** (e.g., [0045], [0069]-[0070]: "a NURBS curve 151 expressed by Expressions 1, 2 and 3 and a tool axis vector 152 on each point as shown in Fig. 16 are calculated by a NURBS curve generating method", Fig. 5: "Both (X,Y,Z) and (i,j,k) data shall be converted into NURBS data"), **and from five splines if the support points are defined in machine coordinates, whereby an independent spline is produced for each**

coordinate (e.g., [0045], [0052]: "each NURBS curve of the three linear axes (Mx, MY, Mz) and two rotary axes (B,C) is calculated"), **and wherein the CAD/CAM system is adapted to produce at least one APT file (22)** (e.g., Fig. 1 #11), **and further comprising at least one downstream-connected post processor (26)** (e.g., Fig. 1 #40) **adapted to convert the at least one APT file into at least one control file (27) that is executable by the or each control arrangement (28)** (e.g., Fig. 1 #50), **and whereby the or each control arrangement (28) is adapted to control the motion of the tool along the tool path in accordance with the splines** (e.g., [0034]).

19. Apparatus according to claim 18, further comprising an APT processor (23) (e.g., Fig. 1 #20), **characterized in that the means (25) allocated to the programming arrangement (21) are arranged and adapted to transfer the splines to the APT processor (23) which is arranged and adapted to transfer the splines to the or each post-processor (26)** (e.g., Fig. 1 #40), **whereby the or each post-processor (26) is arranged and adapted to provide the splines to the or each control arrangement (28)** (e.g., Fig. 1 #50) **in a polynomial format** (e.g., Fig. 1 #43).

20. A method of milling a freeform surface on a workpiece using a miller tool (e.g., Fig. 1 #50), **comprising the steps:**

a) defining tool path way points (e.g., Fig. 5), **each respectively in six workpiece coordinates or five machine coordinates** (e.g., [0045]), **wherein said way points define points within tolerance limits along a contour of a nominal freeform surface that is to be milled** (e.g., Fig. 5);

b) generating a plurality of splines dependent on and fitting said way points sufficiently closely to remain within said tolerance limits of said contour (e.g., Fig. 5), **wherein a respective independent one of said splines is respectively generated for each one of said workpiece coordinates or said machine coordinates of all of said way points, so that said plurality of splines includes a total of six splines respectively allocated to said six workpiece coordinates if said way points are defined in said six workpiece coordinates** (e.g., [0045], [0069]-[0070]: "a NURBS curve 151 expressed by Expressions 1, 2 and 3 and a tool axis vector 152 on each point as shown in Fig. 16 are calculated by a NURBS curve generating method", Fig. 5: "Both (X,Y,Z) and (i,j,k) data shall be converted into NURBS data"), **and said plurality of splines includes a total of five splines respectively allocated to said five machine coordinates if said way points are defined in said five machine coordinates** (e.g., [0045], [0052]: "each NURBS curve of the three linear axes (Mx, MY, Mz) and two rotary axes (B,C) is calculated"); **and**

c) moving said miller tool in contact with and relative to said workpiece so that said miller tool mills said workpiece, and controlling said moving of said miller tool in accordance with said plurality of splines respectively allocated to said workpiece coordinates or said machine coordinates so that said miller tool moves along a tool path defined by said splines in said workpiece coordinates or said machine coordinates and thereby mills an actual freeform surface on said workpiece within said tolerance limits of said contour of said nominal freeform surface (e.g., [0034], Fig. 5).

21. An apparatus for milling a freeform surface on a workpiece, comprising:

a movable miller tool that is movable relative to the workpiece (e.g., Fig. 1 #50);

plural control arrangements (e.g., Fig. 1 #40) **respectively adapted to control a motion of said miller tool respectively in six workpiece coordinates or in five machine coordinates** (e.g., [0045]);

a programming arrangement (e.g., Fig. 1 #10) **programmed to define tool path way points in said six workpiece coordinates or in said five machine coordinates** (e.g., [0045]), **wherein said way points define points within tolerance limits along a contour of a nominal freeform surface that is to be milled** (e.g., Fig. 5);

a processing arrangement that is interposed between said programming arrangement and said control arrangements (e.g. Fig. 1 #20), **and that is adapted and programmed to generate a plurality of splines dependent on and fitting said way points sufficiently closely to remain within said tolerance limits of said contour, wherein a respective independent one of said splines is respectively to be generated for each one of said workpiece coordinates or said machine coordinates of all of said way points, so that said plurality of splines includes a total of six splines respectively allocated to said six workpiece coordinates if said way points are defined in said six workpiece coordinates** (e.g., [0045], [0069]-[0070]: "a NURBS curve 151 expressed by Expressions 1, 2 and 3 and a tool axis vector 152 on each point as shown in Fig. 16 are calculated by a NURBS curve generating method", Fig. 5: "Both (X,Y,Z) and (i,j,k) data shall be converted into NURBS data"), **and said plurality of splines includes a total of five splines respectively allocated to said five machine coordinates if said way points are defined in said five machine coordinates** (e.g., [0045], [0052]: "each NURBS curve of the three linear axes (Mx, MY, Mz) and two rotary axes (B,C) is calculated"); **and**

wherein said control arrangements are adapted to control the motion of said miller tool in accordance with said plurality of splines respectively allocated to said workpiece coordinates or said machine coordinates so that said miller tool is adapted to move along a tool path defined by said splines in said workpiece coordinates or said machine coordinates and thereby to mill an actual freeform surface on said workpiece within said tolerance limits of said contour of said nominal freeform surface (e.g., [0034]).

Response to Arguments

Applicant's arguments, see pages 11-13, filed 04/17/2007, with respect to the drawing objections have been fully considered and are persuasive. The drawing objections have been withdrawn.

Applicant's arguments, see page 13, filed 04/17/2007, with respect to the claim objections have been fully considered and are persuasive. The claim objections have been withdrawn.

Applicant's arguments, see pages 13-17, filed 04/17/2007, with respect to the rejection of claims 2, 3, and 13-15 under 35 U.S.C. 112 1st paragraph (enablement) have been fully considered and are persuasive. The rejection of claims 2, 3, and 13-15 under 35 U.S.C. 112 1st paragraph (enablement) have been withdrawn.

Applicant's arguments, see pages 17-18, filed 04/17/2007, with respect to the rejection of claims 1-3, 8-9, and 11-15 under 35 U.S.C. 112 2nd paragraph have been fully considered and are persuasive. The rejection of claims 1-3, 8-9, and 11-15 under 35 U.S.C. 112 2nd paragraph have been withdrawn.

Applicant's arguments, see pages 18-19, filed 04/17/2007, with respect to the rejection of claims 1-3, 8-9, and 11-14 under 35 U.S.C. 102(b) as being anticipated by EP 1,235,126 (Hirai et al.) have been fully considered but are not persuasive. Applicant argues that Hirai et al. does not disclose generating five or six independent splines respectively allocated to the five or six coordinates, directly from the coordinate data of the way points or support points. However, Hirai et al. discloses that each NURBS curve (spline) of the three linear axes (Mx, My, Mz) and two rotary axes (B,C) is

calculated (e.g., [0045], [0052]). Thus, Hirai et al. generates five splines for each of the five machine coordinates. Likewise, Hirai et al. executes a similar procedure when there are six workpiece coordinates (e.g., [0045], [0069]-[0070]: "a NURBS curve 151 expressed by Expressions 1, 2 and 3 and a tool axis vector 152 on each point as shown in Fig. 16 are calculated by a NURBS curve generating method", Fig. 5: "Both (X,Y,Z) and (i,j,k) data shall be converted into NURBS data").

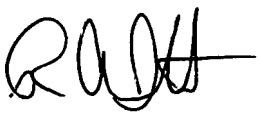
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ryan A. Jarrett whose telephone number is (571) 272-3742. The examiner can normally be reached on 10:00-6:30 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Picard can be reached on (571) 272-3749. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Ryan A. Jarrett
Examiner
Art Unit 2125



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